

Appl. No. : 09/876,281
Filed : June 6, 2001

AMENDMENTS TO THE CLAIMS

1. **(Currently Amended)** A multilumen catheter for directing the flow of blood through a patient through a single cannulation site, said catheter comprising:

a catheter body having a proximal end configured to enable the catheter to be applied through a single cannulation site, a first distal end, and a second distal end, said first distal end extending distally further from the proximal end than the second distal end and said second distal end being closer to the proximal end than to the first distal end;

a first lumen at least partially defined by a wall for passing blood through the body extending between said first distal end and said proximal end adapted to fluidly communicate with the patient;

a second lumen at least partially defined by the wall for passing blood through the body extending between said second distal end and said proximal end adapted to fluidly communicate with the body independently of the first lumen; and

at least one aperture on said body communicating with said first lumen, wherein the distance from the first distal end to the aperture is a first length, the distance from the second distal end to the aperture is a second length, and the distance from the first distal end to the second distal end is a third length, wherein the first length is greater than the third length and the first length is at least three times greater than the second length;

said catheter body having a continuous outer surface surrounding said first and said second lumens along at least a portion of said body distal of said aperture;

wherein at a location where the distance between the first and second lumens is smallest, only a single wall extends between the first and second lumens at least at the second distal end.

2. **(Canceled)**

3. **(Withdrawn)** The multilumen catheter of Claim 1 further comprising a Y-connector positioned at the proximal end, wherein a first leg of the Y-connector is in fluid

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communication with said first lumen and a second leg of the Y-connector is in fluid communication with said second lumen.

4. **(Original)** The multilumen catheter of Claim 1 further comprising an outflow conduit fluidly engaged to one lumen and an inflow conduit fluidly engaged to the other lumen, said inflow and outflow conduits fluidly coupled to a pump so that when connected to a patient, said pump circulates blood from one distal end of said multilumen catheter to the other distal end and also through the at least one aperture.

5. **(Original)** The multilumen catheter of Claim 1 wherein the first distal end is tapered.

6. **(Original)** The multilumen catheter of Claim 1 wherein the second distal end is tapered.

7. **(Original)** The multilumen catheter of Claim 4 wherein one of said distal ends comprises at least one distal aperture.

8. **(Original)** The multilumen catheter of Claim 1 wherein one of said distal ends comprises at least one distal aperture.

9. **(Original)** The multilumen catheter of Claim 1 wherein said first distal end comprises a J-tip comprising a bend.

10. **(Original)** The multilumen catheter of Claim 9 wherein said J-tip comprises an aperture positioned at the distal-most portion of the bend.

11. **(Original)** The multilumen catheter of Claim 1 further comprising a radiopaque marker, wherein the radiopaque marker can be used to position the catheter when the catheter is applied to a patient.

12. **(Original)** The multilumen catheter of Claim 1 further comprising an indicator near the proximal end, wherein the indicator can be used to position the catheter when the catheter is applied to a patient.

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13. **(Withdrawn)** The multilumen catheter of Claim 4 further comprising a third lumen having a distal and a proximal end configured to be positioned entirely within the patient's vascular system.

14. **(Withdrawn)** The multilumen catheter of Claim 1 further comprising a third lumen having a distal and a proximal end configured to be positioned entirely within the patient's vascular system.

15. **(Withdrawn)** The multilumen catheter of Claim 14 wherein the distal end of the third lumen is tapered.

16. **(Withdrawn)** The multilumen catheter of Claim 15 wherein the proximal end of the third lumen is tapered.

17.-26. **(Canceled)**

27. **(Currently Amended)** An extracardiac pumping system for supplementing blood circulation in a patient without any component thereof being connected to the patient's heart, the extracardiac system comprising:

 a pump configured to pump blood through the patient at subcardiac flow rates, said pump having an average flow rate that, during normal operation thereof, is substantially below that of the patient's heart when healthy;

 an inflow conduit fluidly coupled to the pump to direct blood to the pump from a first blood vessel;

 an outflow conduit fluidly coupled to the pump to direct blood from the pump to a second blood vessel; and

 a multilumen catheter for directing the flow of blood through a patient through a single cannulation site, said catheter comprising

 a catheter body having a proximal end, a first distal end, and a second distal end, said first distal end extending distally further from the proximal end than the second distal end;

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a first lumen extending between said first distal end and said proximal end, said first lumen in fluid communication with one of said conduits; and

a second lumen extending between said second distal end and said proximal end, said second lumen in fluid communication with one of said conduits, wherein the pump is oriented to deliver fluid from the pump to the second lumen;

wherein at a location where the distance between the first and second lumens is smallest, only a single wall extends between the first and second lumens at least at the second distal end.

28. **(Original)** The extracardiac pumping system of Claim 27 further comprising at least one aperture in one of said lumens positioned near the proximal end so that the aperture may enhance perfusion of blood to the patient's vasculature downstream of where the aperture resides in said vasculature when said catheter is inserted into the patient for treatment.

29. **(Original)** The extracardiac pumping system of Claim 27 wherein said first lumen is in fluid communication with said outflow conduit and said second lumen is in fluid communication with said inflow conduit.

30. **(Original)** The extracardiac pumping system of Claim 27 wherein said first lumen is in fluid communication with said inflow conduit and said second lumen is in fluid communication with said outflow conduit.

31.-51. **(Canceled)**

52. **(New)** A multilumen catheter for directing the flow of blood through a patient through a single cannulation site, said catheter comprising:

a catheter body having a proximal end configured to enable the catheter to be applied through a single cannulation site, a first distal end, and a second distal end, said first distal end extending distally further from the proximal end than the second distal end and said second distal end being closer to the proximal end than to the first distal end;

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a first lumen at least partially defined by a wall for passing blood through the body extending between said first distal end and said proximal end adapted to fluidly communicate with the patient;

a second lumen at least partially defined by the wall for passing blood through the body extending between said second distal end and said proximal end adapted to fluidly communicate with the body independently of the first lumen; and

at least one aperture on said body communicating with said first lumen, wherein the distance from the first distal end to the aperture is a first length, the distance from the second distal end to the aperture is a second length, and the distance from the first distal end to the second distal end is a third length, wherein the first length is greater than the third length and the first length is at least three times greater than the second length;

wherein at a location where the distance between the first and second lumens is smallest, only a single wall extends between the first and second lumens at least at the second distal end.